LAKE RECREATION STUDY COMPLETES FIELD SEASON

The Lakes and Ponds Recreation Management Program, in the Department of Forests, Parks & Recreation, coordinates recreation management planning efforts for all lakes and ponds 20 acres and larger in Vermont. The Program recently completed its first season of field data collection.

Two crews of two people each worked at twelve lakes during July and August this year, counting the different types of lake users, documenting recreation facilities and development around the lakes, and administering user surveys designed to determine user satisfaction with lake recreation experiences. The twelve study lakes were Lewis Pond, Lake Willoughby, Greenwood Lake, Green River Reservoir, Indian Brook Reservoir, Shelburne Pond, Lake Dunmore, Lake Sunrise, Sunset Lake (Benson), Wallingford Pond, Gale Meadows Pond, and Grout Pond. In future summers, the Program hopes that all other lakes and ponds 20 acres and larger in the state will be surveyed for this background information.

The seeds of the Program were planted about ten years ago when (see "Recreation" on pg. 3)

in this issue...

Recreation Study..................1
Management Conference...............1
Volunteer Dive Club..................2
Pondweed..........................9
Volunteer Thanks....................10
Lake Associations and
Municipal Planning................12
Lake Lingo.........................13
Herbivore Research Update...........14
New Milfoil Lakes..................16

LAKE CHAMPLAIN MANAGEMENT CONFERENCE UPDATE

The Lake Champlain Management Conference (LCMC) convened on June 3, 1991 marking another historic day for the lake. The gathering followed only two and one-half years after the memorable signing of the Memorandum Of Understanding on Environmental Cooperation on the Management of Lake Champlain by Vermont, New York and Quebec.

As mentioned in the last issue of Out of the Blue, the LCMC was created by Congress under the Lake Champlain Special Designation Act of 1990. In addition to establishing the 31 member conference, the Act brings with it much needed federal funding for Lake Champlain management and research programs. Congress appropriated $2 million to the Environmental Protection Agency in 1991 to establish the Management Conference and begin a research program for the Lake. The LCMC is charged with developing a pollution prevention, control and restoration plan for the lake by 1993.

WHO'S WHO

Confusion about this new Lake Champlain Program is understandable. The sudden (see "Conference" on pg. 5)
Volunteer Dive Club Aids A Vermont Milfoil Lake

The New England Aquarium Dive Club's network of environmentally conscious scuba divers, the Diver's Environmental Survey (DES), assisted the Department of Environmental Conservation in an underwater search for Eurasian watermilfoil in a Vermont lake in June.

Although DES and the Department were unable to rally a lot of local divers, three DES divers drove the distance from eastern Massachusetts to Lake Dunmore in Salisbury and Leicester, Vermont to assist the Department. Together with Lake Dunmore resident Jeff Wallin, they participated in a day long underwater search for Eurasian watermilfoil at known and suspected boat launch sites on Lake Dunmore. All six existing or potential boat launch sites (excluding the Fish and Wildlife public boat access) were checked, with no sightings of Eurasian watermilfoil reported.

Since the majority of the suspected launch sites are located on private property, the Lake Dunmore - Fern Lake Association has agreed to speak with individual property owners about boats launching at these areas, emphasizing the importance of boaters checking their equipment for milfoil fragments before and after launching. If property owners are willing to ask launch site users to be conscientious and aware of the milfoil threat, the need to check these sites annually by scuba divers could be eliminated.

The Department welcomed the volunteer diving assistance on Lake Dunmore and hopes to utilize the volunteer services of DES in the future.

Any lake group, association or individual interested in obtaining more information on DES should contact: Diver's Environmental Survey, P.O. Box 294, Billerica, MA 01821-0294.
Recreation (continued from page 1)

recreational conflict on lakes and ponds began to be recognized as an issue by Vermont Legislature. Numerous study committees and years later (in 1990), Act 265 was enacted, including a section which requires the Secretary of the Agency of Natural Resources (ANR) to develop recreation management plans for every lake and pond 20 acres and larger.

In anticipation of the legislation, a comprehensive study of lake recreation methods was commissioned in 1989 by the ANR. The statewide management framework that grew out of that study was critiqued and revised by citizens, Agency personnel and legislators during the winter, spring and summer of 1991. A method of gathering recreation field data was developed based upon the framework, and was tested and refined this summer at the twelve lakes listed above.

The choice of these twelve particular lakes was not random. It was based upon four factors: 1) the existence of a petition for surface use regulation pending before the Vermont Water Resources Board, 2) regional planning commission priorities, 3) geographic distribution around the state, and 4) distribution among lake recreation types. This last factor requires further explanation.

It was noted in the lake recreation management framework that different lakes offer different types of recreational experiences, based upon numerous characteristics of the lake environment. Among the determining characteristics are the size of the lake, the amount of development around the lake, existing uses of the lake, and the abundance or lack of wildlife. Combinations of these and other factors produce the "ambiance" that characterizes a lake, and determines the type of recreational activities that are pursued there.

The management framework identified general categories of lake recreation experiences available on Vermont lakes, and described "typical" lakes in each category.

Four categories resulted, which are:

TYPE 1: wilderness/solitude
TYPE 2: non-motorized recreation
TYPE 3: low-speed motorized with compatible non-motorized recreation
TYPE 4: high-speed motorized with compatible low-speed and non-motorized recreation

Since the definition of a "wilderness/solitude" lake is as yet undetermined, the first two categories have been temporarily combined as Type 2 lakes. Using the resulting three categories, each lake and pond 20 acres and larger in the state has been preliminarily "typed" according to its present uses, based upon anecdotal information from state managers, regional planning staff, and citizens familiar with each lake.

The benefit of this "typology" is that managers can begin to see similarities between various lakes in the same category, which is useful for finding solutions to management problems. Similarly, citizens and planners can utilize the descriptions of "typical" lakes in the four categories, perhaps helping them formulate a vision, as they identify their goals in the lake recreation management planning process.

This search for goals in lake recreation management is the next step in the process. Having assembled background information (continued on the next page)
this summer, citizens, planners and state managers can begin to make decisions about the goals and desires for each body of water. As suggested by the statewide management framework, these goals should reflect the participants' vision of the ideal recreational "ambiance" of each lake. One lake may be envisioned as preserving the status quo, for instance by maintaining a pattern of low-speed motorized use primarily for fishing and quiet recreation. Another lake may be envisioned as encouraging more active, social recreations such as waterskiing or tubing, with increased access to the lake to help local businesses. Still another lake may be seen as needing a scaling back of boating use, perhaps eliminating motors from the lake altogether.

The articulation of lake recreation goals must be specific if they are to serve a useful purpose. Since much of what we call recreation is an "experience" not measurable in numbers, the goals for recreation should describe the elements of that experience. This does not mean that all the goals are vague or "touchy-feely." On the contrary, they must be very precise in describing the type of physical elements that combine to create the desired ambiance or experience.

Expressed in this way, a vision of a lake with increased access and more types of social recreation might be realized through goals such as: "Four new launch lanes for trailered boats shall be built on Lake ______ by 19__," or "The town plan shall be revised to encourage the opening of lake-related businesses in the lakeshore area."

With concrete goals of this kind, the management system called "Visitor Impact Management", or VIM, recommended in the statewide management framework, can be implemented. For a complete explanation of this management system, obtain a copy of the Executive Summary of the Vermont Lake Recreation Management Study, available from the Lakes and Ponds Recreation Management Program in the Department of Forests, Parks and Recreation (see address below).

What's next for the Lakes and Ponds Recreation Management Program? In anticipation of no funding support from the Legislature for the next few years, the Program's success will depend on the volunteer efforts of lake associations, interested individuals, and town commissions or boards to gather data and plan. This winter, a Volunteer Lake Recreation Monitoring Program will be created to assist local groups interested in participating.

If you, your lake association, or your town are interested in assisting with this important information collection step to begin the recreation management process on your local lake please contact: Hilary Batson, Program Coordinator Lakes and Ponds Rec. Program VT Department of Forests, Parks and Recreation 103 S. Main St., 8 South Waterbury, VT 05671 802-244-8713
proliferation of conferences, committees, and subcommittees is enough to make anyone's head spin. The Special Designation Act sets up a program which is modeled after similar basin planning initiatives such as the Chesapeake Bay Program, the Long Island Sound Study and Narragansett Bay Project. All of these programs have similar organizational structures involving management, planning, citizens and technical committees. The goal is to achieve broad participation in the decision-making process and to arrive at consensus on a plan for the future of Lake Champlain. In the Lake Champlain basin, the following committees have been formed:

Management Conference (LCMC) - a 31 member committee created under the Special Designation Act that is charged with developing a clean-up plan and a research program for the lake. Membership includes the governors of VT and NY, federal agency representatives, state legislators, local government officials, Citizens Advisory Committee (CAC) chairs, and citizen representatives. The LCMC has established two standing subcommittees, an Education and Outreach subcommittee and a Plan Formulation Team.

Citizens Advisory Committees - originally created as a result of the Memorandum of Understanding on the Environmental Management of Lake Champlain. The CACs are made up of citizens and legislators representing diverse interests including environmental organizations, chambers of commerce, sportfishing, industries and agriculture. VT, NY and Quebec have separate committees which meet jointly on a quarterly basis. The Vermont legislature officially recognized the Vermont CAC and gave it a formal legislative charge in 1990.

Technical Advisory Committee (TAC) - appointed by the LCMC to advise them on technical matters. Membership includes representatives from federal, state and local governments, as well as public and private research institutions. The TAC has established several subcommittees, including: eutrophication, non-point source pollution, toxics, lake and land use, fish and wildlife, social and economic issues, modeling, and GIS/database management.

Lake Champlain Research Consortium--an organization formed by seven academic institutions in the Lake Champlain basin to coordinate and facilitate research and scholarship on Lake Champlain, to provide for training and education of students on lake issues and to aid in the dissemination of information gathered through lake research endeavors.

(continued on the next page)
1991 FUNDING DECISIONS

After months of deliberations, the LCMC approved 1991 funding allocations at their August 1 meeting. Because first year funding decisions had to be made in a fairly tight time-frame, the LCMC relied heavily on recommendations from Vermont and New York state agencies as well as the Citizens Advisory Committees. For the first year of the project, funds will be allocated as follows:

<table>
<thead>
<tr>
<th>Category</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administration</td>
<td>$225,000</td>
</tr>
<tr>
<td>Public Education</td>
<td>$250,000</td>
</tr>
<tr>
<td>Demonstration Projects</td>
<td>$428,900</td>
</tr>
<tr>
<td>Characterization/Research</td>
<td>$876,900</td>
</tr>
<tr>
<td>Monitoring</td>
<td>$95,600</td>
</tr>
<tr>
<td>Plan Development</td>
<td>$123,600</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>$2,000,000</strong></td>
</tr>
</tbody>
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Examples of specific projects within these categories include:

**Demonstration Projects**:

**Comprehensive Agricultural Monitoring and Evaluation Network** cost: $167,400
A two-part program involving:
1) the implementation of best available control technologies on farms to demonstrate the effectiveness of agricultural non-point source controls and 2) the development of a comprehensive agricultural monitoring and evaluation network for the Lake Champlain basin as required by the Special Designation Act.

**Archeological Screening for Agricultural Projects** cost: $47,800
To develop a plan to prevent the delay of constructing pollution prevention technologies on farms while protecting sensitive archeological resources.

**Water Chestnut Harvesting Program** cost: $50,000
Support for an on-going effort to control water chestnuts in the South Lake through mechanical harvesting and hand-pulling.

**Electronic Barrier Dams to Control Invasion of Non-native Fauna** cost: $35,900
To conduct a feasibility study for the installation of electronic barrier dams to prevent the introduction of non-native fish into Lake Champlain from the Hudson River.

**Lamprey Control Barrier Dams** cost: $80,000
To build dams to impede the upstream migration of lamprey on Lewis Creek in Vermont and Great Chazy River in New York.

**Submerged Cultural Resources Inventory** cost: $47,800
To inventory and protect vulnerable underwater sites in the southern portion of Lake Champlain.
Characterization/Research

Hydrologic Stream Gauging cost: $107,500
For the maintenance of 19 continuous stream flow gauges which provide information essential to understanding the fate and transport of nutrients and toxic substances in the basin.

Priority Research Projects cost: $266,000
A dedicated fund for lake research. The Technical Advisory Committee will be working with the Lake Champlain Research Consortium to define research projects necessary for the development of the clean-up plan for the lake.

Sediment Toxics Research cost: $250,000
The first year of a two-year study to characterize toxics in Lake Champlain sediments. Sites will be screened and nine sites will be chosen for more detailed evaluation and analysis.

Geographic Information Systems cost: $114,700
A three part project which includes: 1) the development of a plan and protocol for a basin-wide geographic information system, 2) a demonstration of the capabilities of a shared GIS system and 3) the development of a mapping framework for future data collection.

Point Source Toxic Characterization and Bioaccumulation Studies cost: $138,700
A two part project designed to: 1) assess point source loadings and whole effluent toxicity for discharges located in Vermont and New York and 2) conduct caged mussel bio-concentration studies at the mouths of tributaries in Lake Champlain.

Monitoring

Atmospheric Deposition of Toxics cost: $68,900
A two-part project designed to: 1) monitor toxic metals in precipitation on Lake Champlain and 2) enhance aerosol monitoring in the basin.
WHERE FROM HERE?

Over the next few months, the Plan Formulation Team of the Management Conference will begin to lay the groundwork for developing a clean-up plan for the lake. The team hopes to have an outline for the plan with draft goals and objectives in time for a research and monitoring workshop in December. The Technical Advisory Committee is working with the planning team on this effort. Experts from other basin planning programs will be invited to meet with the team and share their experiences in the planning process. The team will also be compiling and evaluating existing basin plans, particularly the plan developed during the Lake Champlain Basin Studies of the 1970s. The Plan Formulation Team is hoping to present a proposed time-line for the planning process at the Management Conference's November meeting. They will also be presenting a time-line and framework for considering next year's funding allocation.

The LCMC is also in the process of hiring a public involvement and education coordinator. The coordinator will work with the LCMC's Education and Outreach Subcommittee and the VT, NY and Quebec CACs to plan and implement a public involvement and education program for the basin.

For more information please contact:
Lisa Borre
Lake Champlain Project Coordinator
103 South Main Street
Waterbury, VT 05671-0301
802-244-1137 or 1-800-244-9140 (VT only)

LAKE LINGO

Habitat - the area where a particular animal or plant lives or grows. Animals or plants often have specific habitat requirements.

Flora - plants found in a certain region.

Fauna - animals found in a certain region.

Herbivore - an animal which feeds on plants.

Predator - an animal which consumes other animals.

Point source - pollution coming from a discrete location such as the discharge pipe of a municipal or industrial wastewater treatment system.

Lake Protection Plan - a comprehensive strategy designed to protect a lake from degradation of water quality or other values. A protection plan would consider how to manage both current and future land uses.
Big-leaf Pondweed

Big-leaf Pondweed's large, curly, brownish leaves are a common sight in most Vermont lakes. It is also called Pickerel Weed, Muskie Weed and Bass Weed because it provides excellent fish habitat. Want to know where the fish are in your lake? Try fishing the edges of a Big-leaf Pondweed bed.

Big-leaf Pondweed is, in fact, one of the most valuable plants in terms of fish and wildlife habitat, primarily due to its tall, leafy structure. These large leaves provide shade and reduce water turbulence. Aquatic insects, an essential fish food, live and feed on the leaves. The large leaves provide a spawning surface for fish such as golden shiners, whose eggs need to be held up off the bottom sediments. Plant beds also offer young fish a place to hide from predators, as well as food such as plankton, which live in the sheltered water. The northern pike, a predatory fish, hides in plant beds to wait for prey.

In addition to Big-leaf's numerous values to fish, it is also considered an important waterfowl food source; many species of ducks are known to eat its foliage and seeds. Mammals, such as beaver, muskrat and moose, also make use of the plant as food.

Big-leaf Pondweed (scientific name: *Potamogeton amplifolius*) belongs to a large aquatic plant family known as the "Pondweeds", of which there are 24 species in Vermont. The family is diverse, ranging from small, very thin-leaved plants, to the larger leaved types such as Big-leaf. Big-leaf Pondweed has the largest leaves of the group; they are generally 2-3 inches wide and 4-5 inches long. Big-leaf also has some floating leaves. These elliptical leaves are sturdier than the submersed leaves, and probably help the plant survive in a variety of water conditions. Small, greenish nondescript flower stalks extend a few inches above the water's surface and, when fertilized, produce hard green nutlets.

This important plant has been found in about half of the 192 Vermont lakes surveyed since 1982 by the Lakes and Ponds Unit, indicating the plant is tolerant of many different water quality conditions. Look for it your lake, and consider yourself lucky if you find it!

For more information about lake plants, please request "Lake and Pond Plants: A Guide to Vermont's Common Aquatic Plants and their Natural Values in Lakes" or "A Key to Common Vermont Aquatic Plant Species."
THANKS TO LAKES AND PONDS UNIT PROGRAM VOLUNTEERS

The Lakes and Ponds Unit is extremely fortunate to have the assistance of many dedicated and conscientious volunteers for a number of its programs. The Unit would like to express its appreciation and sincere thanks to all of these volunteers; many of Vermont’s lakes and ponds would be at a loss without you!

Milfoil Watchers Program

The Milfoil Watchers Program is a statewide network of concerned lake enthusiasts who conduct periodic searches of Vermont lakes not known to support a Eurasian watermilfoil population or only having a small localized population. Identifying a recent milfoil introduction in a lake or in a previously unknown area of a lake may provide the best chance to successfully manage the nuisance plant.

Training workshops held this summer in Rutland, Waterbury and Newport trained seven new Milfoil Watchers. There are now 52 lakes in the state protected by a Watcher. All three workshops were also attended by Milfoil Watchers who had been trained in past years and were interested in keeping abreast of new milfoil developments in Vermont. Milfoil Watchers training sessions were also conducted at three lakes with small, localized populations - Lake Dunmore (Salisbury, Leicester), Lake Iroquois (Hinesburg, Williston) and Burr Pond (Sudbury). In addition to learning the seriousness of the milfoil problem and identification and search techniques, participants were instructed in how to control milfoil spread by hand-pulling rooted milfoil plants.

Over 130 volunteers are actively participating in the Milfoil Watchers Program. Thanks to these dedicated and concerned individuals, many of Vermont’s lakes threatened by Eurasian watermilfoil are protected by a watchful eye. Thank you for all of your efforts!

Many Vermont lakes are still in need of the protection offered by a Milfoil Watcher and trained Watchers are in need of assistance on lakes already involved in the program. Become trained as a Milfoil Watcher; Vermont’s lakes and ponds need your help against this serious threat! Eurasian watermilfoil must not be allowed to invade any more of Vermont’s water resources. Please, get involved - call Ann Bove or Holly Crosson at 802-244-5638.

Lay Monitoring Program

Since 1979, people interested in Vermont’s lakes have been volunteering their time to monitor water quality through the Vermont Lay Monitoring Program. Trained and equipped by DEC these dedicated individuals spend several hours a week during the summer months collecting data on water transparency, chlorophyll-a and phosphorus. Baseline data collected by monitors is used by state and federal governments to make critical decisions regarding lake management and protection. Lay monitoring data is the only long term water quality information available on a number of lakes.

During the summer of 1991, over 100 volunteers monitored 47 lakes and 26 stations on Lake Champlain. Their contributions towards protecting Vermont’s valuable lake resources are greatly appreciated!

New monitors are needed next summer (1992) for three Lake Champlain Stations - Butler Island (VT), Treadwell Bay (NY), and Cumberland Bay (NY). If you have an interest in lake water quality, a few hours a
Lake Champlain Volunteers

The Lake Champlain Precipitation Monitoring Program began in the spring of 1991 specifically to provide precipitation data for the Lake Champlain Phosphorus Study. The Phosphorus Study monitors current levels of phosphorus in Lake Champlain as well as various sources of phosphorus to Lake Champlain, including precipitation. To gather precipitation data, three volunteers have been equipped with precipitation collection devices. These homemade collectors consist of a large plastic funnel with a tube attached to the apex leading down into a 1000ml (approximately one quart) collection container. The entire apparatus is attached to a metal stake and the funnel is supported approximately six feet above the ground. The volunteer monitors are also provided with precipitation gauges so that daily amounts may be measured. During the winter, the collection devices are substituted with snow buckets (five gallon plastic pails). The snow bucket is brought in following each event and the snow is melted by placing the bucket in a hot water bath. The rain or liquid snow is transferred into test tubes that are periodically picked up by project staff and brought to the Department of Environmental Conservation Laboratory for phosphorus analysis.

The Lake Champlain Phosphorus Study has benefitted greatly from the conscientiousness of the following volunteers:
- Ray Allen - South Hero, VT
- Dick Ullom - Orwell, VT
- Sumner Williams - Underhill, VT

Lake Champlain Staff Gauge Recorder Program assists the Lake Champlain Phosphorus Study in determining the amount of water flowing into Lake Champlain. Volunteers check on six metal staff gauges that have been installed by the United States Geological Survey (USGS) on select rivers flowing into Lake Champlain. Unlike the majority of rivers monitored for the Phosphorus Study, these six rivers are not equipped with USGS automatic recording stations due to their small size and the high costs associated with automatic stations. The volunteers read the staff gauges on a daily basis during open water, ice free conditions. The staff gauges resemble metal yard sticks and are marked in tenths of feet instead of inches. The gauges measure the depth of the river which is then used to determine the daily discharge, or flow, into Lake Champlain.

The gauges are usually mounted on tubes and placed on the river bank. Two staff gauges may be used on rivers that occasionally flood over the bank and leave the stream bank gauge under water. Unfortunately for the volunteers, the USGS selected the sites based on stream flow considerations and not necessarily convenience to the monitor. One site was ultimately abandoned because it required crossing a high voltage electric sheep fence. Another site requires a rigorous walk (see "Volunteers" on page 13)
A ROLE FOR LAKE ASSOCIATIONS IN THE MUNICIPAL PLANNING PROCESS

Many Vermont towns are currently in the process of either updating or writing their town plan, or following through on a recently adopted town plan by writing or revising zoning regulations. This provides an excellent opportunity for lake associations to promote lake protection efforts. Input from an organization knowledgeable about a local resource such as a lake would probably be welcomed by the planning commission.

The following are brief descriptions of the typical steps in a planning process and some ideas about how a lake association might want to participate.

Goals and Vision

The lakeshore landowners, other local residents and town officials should get together and discuss goals for the lake as well as describe a vision of what the lake should look like in 10, 20, and 50 years. Discussion topics should include the values of the lake, activities occurring on or around the lake, existing or potential water quality problems, and opportunities to maintain or improve water quality. The lake association could do a survey of its members and present a summary of results to the planning commission as additional input into the process.

Lake issues other than water quality may also emerge, such as recreation and protection of undeveloped shoreline. By including these issues, a comprehensive plan for the lake can be realized.

It is also important for town and lake residents to identify common goals, as well as existing conflicts. Addressing these issues will better enable both groups to work together for the benefit of the lake.

Information Collection

The next step in the planning process is to collect information on the lake, shoreland and watershed. The lake association is the ideal group to coordinate or assist with this part of the process as its
members are often involved in water quality sampling and may already be familiar with existing information. Useful pieces of information include water quality sampling results, number of homes on the lake, maps, attendance at recreation areas, means of sewage disposal, land use trends, lake depth, and lake and watershed size. Lakeshore landowners could organize a shoreline survey while other town residents could focus on the watershed. (Lists of information to gather can be found in the manual "Planning for Lake Water Quality Protection" - see end of article).

Gathering and reviewing any existing plan and regulations would also be an important part of this inventory process. These documents will indicate where growth is currently allowed and would provide a base for determining potential water quality implications.

Analysis of Information
The next step is to use the information collected to determine if there are current or future water quality concerns and, if so, how to address them in the plan and through subsequent regulations or programs. A simple way to look at the potential problems would be to list all possible sources of phosphorus and sediment from land uses. (Phosphorus and sediment are the primary cause of lake water quality problems.) Ideas for best controlling each source could be generated at meetings and these ideas can then be incorporated into the planning process.

Lake Protection
Each community needs to decide how much emphasis to place on regulation, voluntary action and incentives in order to protect its lakes. The town plan should present the policies and strategies that will be used to address current and future water quality problems. The strategies need to be realistic, taking into consideration expertise available, number of volunteers, community support and enforcement capabilities, among others.

Get Involved!
There is a lot that lake associations can contribute to the local planning process and now is a good time to start:

* Call your local planning commission chair and find out what the commission is working on.
* Attend one or more planning commission meetings.
* Form a lake (or watershed) subcommittee of the planning commission.
* Gather all existing lake information.
* Organize an outing on the lake (especially if the planning commission members don't have homes along the lakeshore).

For more detailed information on the planning process and lake protection options, there is a manual entitled "Planning for Lake Water Quality Protection" available from the Lake Protection Program. Contact Cathy Kashanski (802-244-6951) or Susan Warren (802-244-5638) to obtain a copy.

Volunteers (continued from page 11)
through a pasture that is home to a possessive bull!

The following volunteers are heartily thanked for their resourcefulness and contributions to the Lake Champlain Phosphorus Study:

Jacques Benoit - St. Armand, Quebec - Rock River
Herman and Cris Herrlick - Colchester, VT - Indian Brook and Malletts Creek
Don Jarrett - St. Albans, VT - Stevens Brook
Jim Manahan - St. Albans, VT - Mill River
Dick Ullem - Orwell, VT - East Creek
Herbivore Research Update

This summer, DEC contractors continued their research on the feasibility of using aquatic insect herbivores as a biological control for the nuisance aquatic plant, Eurasian watermilfoil (see *Out of the Blue* Spring/Summer 1991 issue). Middlebury College researchers conducted field studies on Brownington Pond, Lake Bomoseen and Lake Memphremagog while Castleton State College researchers concentrated their efforts on Glen Lake. All four of these lakes already have naturally occurring populations of weevils, or both caterpillars and weevils. Laboratory experiments and herbivore culturing took place at both Middlebury College and Castleton State College. While the data collected this summer has not yet been statistically analyzed, some interesting observations stand out as highlights of this summer’s work.

Weevils were much more abundant in Brownington Pond during 1991 than in the previous year. Eurasian watermilfoil stems frequently had 3-4 eggs and 1-2 larvae per stem in 1991 compared to less than half those numbers in 1990. Milfoil plants that had rebounded somewhat after the 1989 decline were damaged so heavily this year that the population began to collapse again. Plants were bent over and were approximately one meter below the surface. It appears that weevil feeding (for example, puncture holes and stem boring) may cause plant stem tissue to "flood" which results in a loss of plant buoyancy; affected plants cannot remain upright and they collapse. A laboratory experiment conducted at Brownington Pond did determine that weevil feeding reduced the plant's ability to float. This seems to indicate that the weevils do not necessarily have to eat much of the plant before they can have a negative effect on the plant.

Field work initiated in 1990 on Lake Bomoseen was continued and expanded during 1991. To compare herbivore populations in harvested and unharvested areas, four no-harvest areas were established and sampled weekly along with areas that had been mechanically harvested.

As the summer progressed, a dramatic increase in weevil abundance was seen in most no-harvest areas compared to the adjacent harvested areas. Weevils were found at all four no-harvest sites, with substantial populations occurring at two of the four sites. Collapsing milfoil, similar to what was observed on Brownington Pond this summer, was seen at one of the no-harvest sites on Lake Bomoseen. A similar phenomenon was seen in the milfoil beds at Glen Lake. No harvesting takes place in Glen Lake.

Timing of the life stages of weevils in Lake Bomoseen has shown that adults usually first appear in June. By early July, weevil eggs and larvae are found. By late July, all life stages are found, including pupae. As autumn approaches, adult weevil numbers decline significantly and eggs are no longer seen. It is believed that adult weevils actually leave the lake and over-winter by burrowing in leaf litter adjacent to lakes.

Work at the herbivore culturing facility at Middlebury College has been focused on establishing a self-sustaining population of weevils and determining the duration of each life-stage. This summer, researchers were successful in rearing adult weevils.
from eggs that were laid in the laboratory. Castleton State College researchers conducted lab trials to follow the behavior of weevils when choosing among plant species. While the data have not yet been analyzed, it appears there is a strong preference for Eurasian watermilfoil when given a choice of alternative plants. Castleton researchers also documented weevil feeding and mating behavior on video camera.

Updates on this project will appear in subsequent issues of Out of the Blue. For more information, call Holly Crosson at the Lakes and Ponds office in Waterbury (802-244-5638).

Annual Milfoil Report
Each year the DEC publishes the "Vermont Eurasian Watermilfoil Control Program Report" which gives a brief overview of milfoil prevention and control activities around the State. The 1991 report will be available in the Spring and will have information on biological control of milfoil with insects, new milfoil lakes in Vermont, the Milfoil Watchers Program and more. Copies of the report from 1987-1990 are currently available at no charge from the DEC.

For Your Lake’s Sake
New pamphlet available!
A recently published pamphlet is now available for distribution. "For Your Lake’s Sake" details pollution prevention activities for lakeshore residents. A full page chart explains how to manage your septic system, shore frontage, driveways and more to prevent polluting runoff to the lake. The suggestions are also relevant to anyone living in the lake’s watershed, even if they are located well back from the lake’s edge. To request copies please contact Susan Warren (802-244-5638) or Cathy Kashanski (802-244-6951).

Herbivore Slide Show
The Herbivore Slide Show listed in "Audio Visual Materials Available" in the second issue of Out of the Blue was, regrettably, not available this summer on loan. The 30 minute slide show with audio tape will be available in the spring of 1992. For more information or to borrow the slide show contact Holly Crosson at 802-244-5638.
NEW MILFOIL LAKES

The DEC discovered milfoil on the following lakes during the summer of 1991:

- Burr Pond (June 18),
- Lake Morey (August 7),
- Halls Lake (August 14), and
- Beebe Pond (August 27).

The milfoil populations in these lakes ranged from individual plants and fragments to abundant patches of plants. Due to the size of the milfoil plants and/or their location around the lake, it is believed that milfoil has been present in all four of these lakes for at least two years.

VT Department of Environmental Conservation
Water Quality Division
Lakes and Ponds Unit
103 So. Main St., 10 North
Waterbury, VT 05671-0408

Address correction requested.